

International Journal of
ELECTRONICS
 Theoretical and Experimental

Editor: P. A. LINDSAY, D.Sc(Eng.), Ph.D., F.C.G.I., C.Eng., F.I.E.E., F.Inst.P.

Associate Editors: PROFESSOR B. CULSHAW, B.Sc., Ph.D., C.Eng., M.I.E.E.
 PROFESSOR V. L. GRANATSTEIN, B.S., M.S., Ph.D. (U.S.A.)
 PROFESSOR H. L. HARTNAGEL, D.Eng., Ph.D., Dipl.-Ing. (Continental Europe)
 PROFESSOR SHOICHI ONO, B.E., M.S., D.Eng. (Japan)

Consultant Editor: PROFESSOR SIR NEVILL MOTT, M.A., D.Sc., F.Inst., F.R.S.

Editorial Board

France - - -	Professor P. AIGRAIN
U.K. - - - -	Dr. J. E. ALLEN
West Germany -	Dr.-Ing. J. BRETTING
U.K. - - - -	Professor J. E. CARROLL
U.S.A. - - - -	Professor M. CHODOROW
U.K. - - - -	S. DEMOKAN
U.K. - - - -	Professor K. G. EMELEUS
France - - -	Dr. M. GOLDMAN
West Germany -	Professor Dr.rer.nat. W. HARTH
U.K. - - - -	Professor C. A. HOGARTH
U.S.A. - - - -	Dr. H. KOGELNIK
U.S.A. - - - -	Dr. J. M. LAFFERTY
U.K. - - - -	C. A. MAY
France - - -	G. MOURIER
U.K. - - - -	D. H. ROBERTS
U.S.A. - - - -	Professor L. D. SMULLIN
U.K. - - - -	Dr. D. T. SWIFT-HOOK
U.K. - - - -	P. E. TRIER
Japan - - - -	Dr. M. UENOHARA
Sweden - - -	Professor P. WEISSGLAS
U.S.A. - - - -	Professor J. R. WHINNERY

Volume LXII

January 1987 to June 1987



Taylor & Francis
 London and Philadelphia

Subscription Information

Published monthly

Annual subscription 1987 £ 280 DM 1120 US \$530

ISSN 0020-7217

Dollar rates apply to USA, Canada and Mexico. Deutschmark rates to FR Germany. Sterling rates apply to the UK and all other areas.

All subscriptions are payable in advance and all rates include postage. Journals are sent by air to the USA, Canada and Mexico, India and Australasia. Subscriptions are entered on an annual basis, i.e. from January to December. Payment may be made by sterling cheque, dollar cheque, international money order or National Giro, or by credit card (AMEX, VISA, Mastercard/Access).

Orders originating in the following territories should be sent direct to the local distributors:

Australia	R. Hill & Son Ltd, 117 Wellington Street, Windsor, Victoria 3181.
India	Universal Subscription Agency Pvt. Ltd, 101-102 Community Centre, Malviya Nagar Extn Post Bag No. 8, Saket, New Delhi 110017.
Japan	Kinokuniya Company Ltd, Journal Department, PO Box 55 Chitose, Tokyo 156.
New Zealand	R. Hill & Son Ltd, Private Bag, Newmarket, Auckland 1.
USA, Canada and Mexico	Taylor & Francis Inc., 242 Cherry Street, Philadelphia, Pennsylvania 19106-1906.
UK and all other territories	Taylor & Francis Ltd, Rankine Road, Basingstoke, Hampshire RG24 0PR.

Air freight and mailing in the USA by Publications Expediting Inc., 200 Meacham Avenue, Elmont, New York 11003. Second class postage paid at Jamaica, New York 11431. US Postmaster: Send address changes to *International Journal of Electronics*, Publications Expediting Inc., 200 Meacham Avenue, Elmont, New York 11003.

Published by Taylor & Francis Ltd, 4 John Street, London WC1N 2ET, UK. Printed by Taylor & Francis (Printers) Ltd, Rankine Road, Basingstoke, Hampshire RG24 0PR, UK.

Copyright © 1987 Taylor & Francis Ltd

All rights reserved. Authors are themselves responsible for obtaining permission to reproduce copyright material from other sources and are required to sign a form for agreement of the transfer of copyright. All requests from third parties to reprint material held in copyright by Taylor & Francis must be referred to the author for consent as a condition of the granting by Taylor & Francis of permission for reproduction. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form, or by any means, electronic, electrostatic, magnetic, mechanical, photocopying, recording or otherwise, without prior permission in writing from the copyright holder. 0020-7212/87 \$3-00 © 1987 Taylor & Francis Ltd.

Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by Taylor & Francis Ltd for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee is paid directly to CCC, 27 Congress Street, Salem, Massachusetts 01970, USA. (For fee per article see copyright code above.) This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising, for creating new collective works, or for resale. Fees for past articles are the same as those shown for current articles.

CONTENTS OF VOL. LXII (Nos. 1-6)

NUMBER 1—JANUARY

- 1 Noise reduction in space charge limited thermionic diodes. I. BRODIE
- 9 GaAs travelling wave amplifier. J. C. FREEMAN and C. T. HUI
- 27 Non-equilibrium transport in submicron GaAs devices. S. C. TIWARI
- 33 Time dependence of the thermal-voltage memory effect in thin silicon monoxide films. S. A. Y. AL-ISMAIL and C. A. HOGARTH
- 43 Steady-state analysis of a class of carrier synchronizers. ZHI-HE QIU and F. A. Cassara
- 65 Frequency assignment for narrowband services using a dominant carrier in SCPC satellite links. S. H. MNENEY and R. PRASAD
- 79 Analysis of multicylindrical resonant cavity. S. A. ADENIRAN and D. P. HOWSON
- 87 'Mixed semiconductor' thin film transistors. P. SINGH and B. BAISHYA
- 93 Simple attachment to analogue/digital multimeter for frequency measurement up to 10 MHz. A. A. KHAN, A. A. TELBA, M. AL KHALDI
- 97 A new data transmission modem. O. O. OLANIYAN and A. TAIWO
- 105 Microcomputer-controlled autoranging DMM with autocalibration. S. M. R. TAHA and S. S. OMRAN
- 115 Overflow and roundoff analysis of a very-low sensitivity digital filter structure. J. I. ACHA
- 121 Least mean fourth (LMF) lattice adaptive algorithm. S. V. NARASIMHAN and D. N. DUTT
- 129 Barrier height in polycrystalline MIS solar cells. V. K. GOYAL and K. SEN

Research Notes

- 137 A note on Hertz vectors. N. ANDERSON and A. M. ARTHURS
- 141 Wideband frequency-invariant phase meter with lead-lag indication. M. M. ABDUL-NIBY and R. S. FYATH

Optoelectronics

- 147 A comparison of prism coupling and scattered light waveguide attenuation measurements. S. A. M. AL-CHALABI and B. L. WEISS
- 153 Stability of He^+ implanted waveguides in LiNbO_3 . B. L. WEISS and J. M. NADEN
- 157 Books Received
- 159 Announcement

NUMBER 2—FEBRUARY

- 161 Open-circuit testing of CMOS circuits. S. L. HURST
- 167 AC electrical properties of vacuum-evaporated SiO/SnO₂ films. A. S. MD. S. RAHMAN, M. H. ISLAM and C. A. HOGARTH
- 181 Effect of loop-filter and non-linearity on carrier-frequency stabilization in WBFM. W. N. CHEUNG
- 193 Application of Foster network synthesis to frequency selective surface design. M. A. A. EL-MORSY, E. A. PARKER and R. J. LANGLEY
- 199 Optimal design of a switching boost regulator in discontinuous conduction mode. A. IOINOVICI
- 209 A pipelined binary coded decimal adder using the residue number system. O. ADEGBENRO and R. I. SALAWU
- 219 On the probability of error of digital communication systems. N. M. SHEHADEH and SIU-CHEONG SO
- 225 Kinetic theory of the surface recombination of electrons and ions on glass surfaces. K. G. EMELEUS and J. R. M. COULTER
- 229 A simple, wide-range, linear thermistor-based temperature indicator. C. RAMESHU and A. P. SHIVAPRASAD
- 243 Automatic gain control by differential pair current splitting. I. M. FILANOVSKY and V. A. PISKAREV
- 251 SAW injection locking oscillator using built-in injector. A. R. REDDY and S. K. LAHIRI
- 257 Stability of negative feedback systems. P. MARTINEZ, J. GARAY and A. CARLOSENA
- 265 A dual Gunn oscillator: its synchronization and range extension. B. N. BISWAS, S. KARMAKAR and A. K. BHATTACHARYA
- 281 Fast prediction of intermodulation distortion using time domain analysis. A. S. ODEH
- 289 The initiations of pipeline systems. M. K. STOJČEV and I. Ž. MILOVANOVIĆ
- 295 Design of smoothing inductance for rectifier circuits. T. K. SUNDARARAJAN and A. A. SAMSON
- 305 Improving the settling time of a digital phase-lock frequency synthesizer. M. K. MAHMOOD

Research notes

- 313 Switched capacitor first order all pass circuit using two terminal negative input impedance building block. M. J. NIGAM and M. M. KRISHNA
- 317 New *Q* enhancement technique of low pole frequency bandpass filter using single-ended operational amplifiers. A. BARUA

NUMBER 3—MARCH

- 321 The time requirement in noise measurements. D. T. SMITH
- 327 Surface impedance of a three layer earth with a thin intermediate conducting layer. G. AGUIRRE and J. R. WAIT
- 341 Performance comparisons of a new negative impedance converter with a translinear implementation. A. FABRE and P. ROCHEGUDE
- 347 Non-linear analogue-to-digital conversion through PWM. J. N. LYGOURAS
- 353 Transient and steady-state processes in RC choppers. M. A. SLONIM and T. M. KREMER
- 361 Xerographic time of flight experiment for the determination of drift mobility in high resistivity semiconductors. S. M. VAEZI-NEJAD
- 385 Universal microprocessor controller for thyristor phase control of multiphase converters. M. BENEDETTI and C. F. CHRISTIANSEN
- 393 Estimating the parameters of a low frequency sinusoid with noise and harmonic distortion. A. I. ABU-EL HAJJA
- 411 A PLL generator producing equidistant pulses with large-range phase shift. Ș. BÎRCĂ-GĂLĂȚEANU and A. GRAUR
- 417 Programmable differential amplifiers. S. I. KOUTZAROV
- 425 The feasibility of a dynamic test generation method. S. VÁRSZEGI
- 435 Optimizing the performance of modified field effect transistor. A. A. KHAN and L. SINGH
- 441 An improved non-restoring array divider with carry-save and carry-look-ahead techniques. H.-Y. LO and J.-H. LU
- 449 Analysis of pulse-fed power electronic circuits using Walsh function. A. DEB and A. K. DATTA
- 461 Thermal annealing behaviour of proton-irradiated Au-Ti-GaAs and Al-GaAs Schottky barrier diodes. J. I. EJIMANYA
- 473 Implementation of a modified CVSD coder. V. D. MYTRI and A. P. SHIVAPRASAD
- 481 Books Received

NUMBER 4—APRIL

- 483 Negative resistance and distributed gain in submicron semiconductor diodes using analytical solutions of the Boltzmann transport equation. C. M. KROWNE
- 507 Pyramidal aperture matched horns. A. KUMAR
- 515 Sinusoidal oscillators employing current conveyors. C. P. CHONG and K. C. SMITH
- 521 An RF Class C power amplifier for dielectric heating applications. K. M. NG, S. HINCHLIFFE and L. HOBSON

- 533 Electrical polarizability of small apertures: analytical approach. V. I. FABRIKANT
- 547 A bit-slice error-correction erasure-filling decoder for a (15, 11) Reed-Solomon code. A. KATSAROS
- 559 Electromagnetic waves in magnetized ferrite spheres. X. YANSHENG
- 567 Low temperature photoconductivity in anodic tantalum oxide thin films. W. H. BOKHARI and F. M. NAZAR
- 573 A simplified computer-oriented algorithm for obtaining stable reduced-order models by using Routh approximations. S. S. BEDAIR, W. H. ABULSHOHOU and A. I. SALEH
- 579 Extension of the ramp-type limiter based Robinson oscillator analysis. R. MUTABŽIJA
- 589 A combinational word-parallel and bit-parallel associative processor. H.-Y. LO and F. HSU
- 599 Efficient algorithms for some graph problems on a tree-structured parallel computer. P. Chaudhuri
- 617 A precise LF frequency detector based on Taylor series. S. M. R. TAHA
- 625 Xerographic-mode transient charge technique for probing drift mobility in high-resistivity materials. A. Y. C. CHAN and C. JUHASZ
- Research notes**
- 633 Unified structure for generating orthogonal polynomials. M. M. MILIĆ and P. D. SIMIĆ
- 635 Novel parasitic insensitive SC large pole selectivity (Q) bandpass filter with less capacitor spread and low pole ' Q ' sensitivity. A. BARUA

NUMBER 5—MAY

Antennas and electromagnetic radiation

- 641 Invited paper. Some observations on the computer-aided design/synthesis of slotted-waveguide antennas. A. J. SANGSTER and A. H. I. MCCORMICK

Circuit techniques and analysis

- 663 New explicit formulae for Butterworth filter design. J. F. TENG and P. R. ADBY
- 667 Electronically tunable all-pole low-pass leapfrog ladder filter with operational tranconductance amplifier. R. NAWROCKI
- 673 Research note. Parameter space approach in analysing a class of complex digital filters. P. K. SIM

Gas discharge and vacuum devices

- 679 Role of photons in the glow discharge in hollow cylindrical cathodes. R. M. CHAUDHRI, M. M. CHAUDHRI, F. DEBA and M. N. CHAUDHRI

Physical electronics

- 685 The effect of annealing on the AC electrical properties of SiO/SnO_2 amorphous thin films. A. S. Md. RAHMAN, M. H. ISLAM and C. A. HOGARTH

- 691 Field effect studies on metal-insulator-semiconductor structures of laser annealed n -type $\text{Pb}_{0.8}\text{Sn}_{0.2}\text{Te}$ epitaxial thin films. A. L. DAWAR, C. JAGADISH and P. C. MATHUR
- Signals, data and communications**
- 707 Invited paper. Algorithms for functional testing of digital systems. F. LOMBARDI and C.-L. WEY
- 733 A switched memory decoding circuit for bus oriented microprocessor systems. G. D. BERGMAN
- 739 Fast test generation and partial testing for combinational logic circuits. J. LIU
- 747 The Walsh-Hadamard/discrete Hartley transform. C.-Y. HSU and J.-L. WU
- 757 Research note. Threshold switching in vanadate devices and the effect of temperature of the V_2O_5 melt. E. GATTEF and Y. DIMITRIEV
- Instrumentation**
- 761 Microstep of digital control for step motor and its test using a laser interferometer measurement system. H.-Y. LO and J.-L. CHEN
- 781 Analysing impulse response of enclosures with the aid of a charge transfer device. A. A. R. ALJUDI
- 789 A new atmospheric refractivity meter. S. A. ABDULLA, K. M. IBRAHEM, A.-K. A. MOHAMMED and A. M. JASSIM

NUMBER 6—JUNE

Antennas and electromagnetic radiation

- 799 Angular momentum and helicity of electromagnetic fields. N. ANDERSON and A. M. ARTHURS

Circuit techniques and analysis

- 803 Current-mirrors RC -oscillators. S. POOKAIYAUDOM, K. SAMOOTRUT and W. KURUTACH
- 809 Application of ANSWICAP: computer-aided symbolic analysis of digital filters. J. F. DUQUE-CARRILLO and J. J. PÉÑA-BERNAL

Coding, computers and algorithms

- 815 Invited paper. Partitioned linear block simplex matrix codes for computer memory and real compound channels with memory. J. P. DAILAKIS and D. C. VOUKALIS

Gas discharge and vacuum devices

- 837 A new generation of vacuum tubes for modulator and switch applications. F. R. FULLER and W. BRUNHART

Physical electronics

- 843 Comparison of the threshold voltage criteria for narrow-channel MOS transistors. A. M. ASENOV, E. N. STEFANOV and B. Z. ANTOV
- 849 Constant peak field distribution and voltage dropping in the oxide layer of a MOS capacitor during charge-temperature aging. J.-G. HWU and W.-S. WANG

857 The silica glass passivation for high-voltage power transistors. B. D. LIU, C. Y. CHANG and K. C. CHEN

863 DC characteristics of analogue compatible I³L transistors. S. KAL

Signals, data and communications

875 A novel PPM scheme (the 3-L CS-E-PPM) with application to inverter drives. J. THEOCHARIS and V. PETRIDIS

895 Invited paper. Application of the least mean fourth (LMF) adaptive algorithm to signals associated with gaussian noise. S. V. NARASIMHAN

915 Intermodulation distortion in SCPC/FDMA system in the presence of a dominant carrier. S. H. MNENEY and R. PRASAD

Power electronics

923 Design-oriented analysis of common switching DC to DC converters. A. IOINOVICI and A. SHENKMAN

935 A simple method for achieving immunity to internal noise signals in thyristors. A. P. SILARD

949 A fast acting detector for abnormal output voltages of an UPS system. S. K. BISWAS, B. BASAK and J. VITHAYATHIL

953 Microprocessor-based implicit RMS meter. M. A. H. ABDUL-KARIM, S. M. R. TAHA and S. S. OMRAN

961 Books Received

963 Subject index

965 Author index